

# Report on Field Observations 5/2002-11/2002

By Bill Pine  
Ontario, California

This report includes all observations made and submitted since the last issue of the Journal. All INSPIRE participants are encouraged to make observations and send their data tapes and logs in for analysis.

The guidelines for observations are:

1. Fill out a log cover sheet and data sheets for each observation.
2. Place a voice introduction on each tape indicating team, date and start time.
3. Insert a time mark every two minutes during the observations.
4. Submit the data as indicated on the Coordinated Observation page.

The observations in this report will be given in chronological order and will include the Coordinated Observation sessions. The convention for naming files is the following:

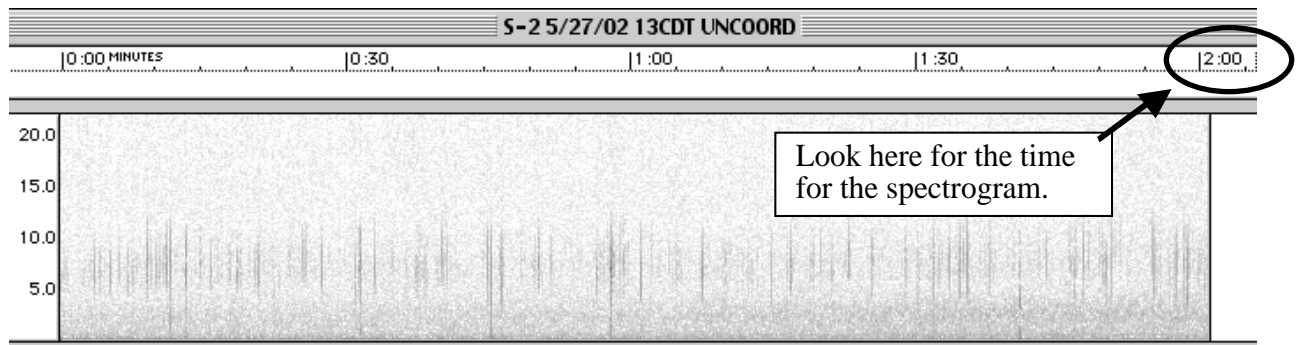
**I-3 11/23/02 06CST 13UT**

Team Number Date Start Time Local Start Time UT.

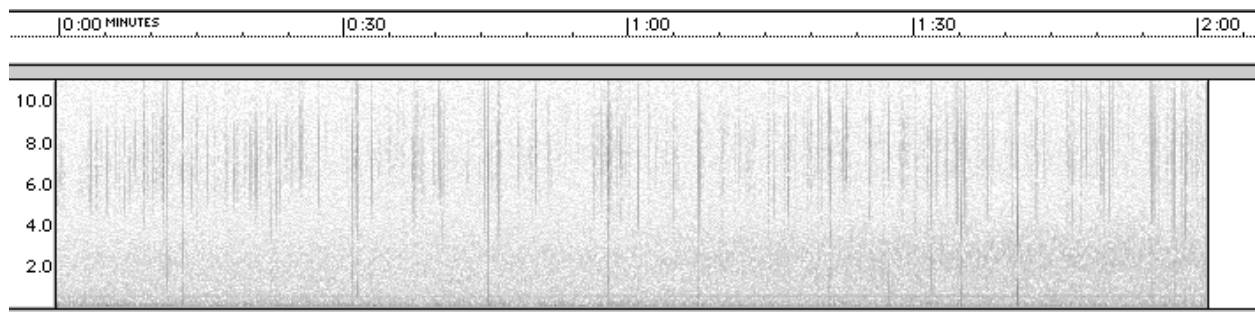
Spectrograms made for data analysis include the first 2 minutes 0-22 kHz range; the first 2 minutes 0-11 kHz range; the first minute 0-11 kHz range and the first 30 seconds 0-11 kHz range. Spectrograms are also made of any portions of the tape requested by the observer.

**5/27/2002 Team S-2 Mark Mueller, Brown Deer High School, Brown Deer, WI**

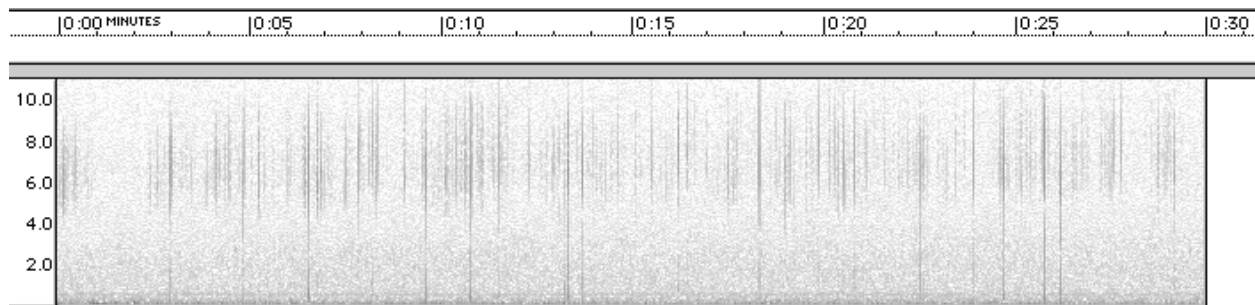
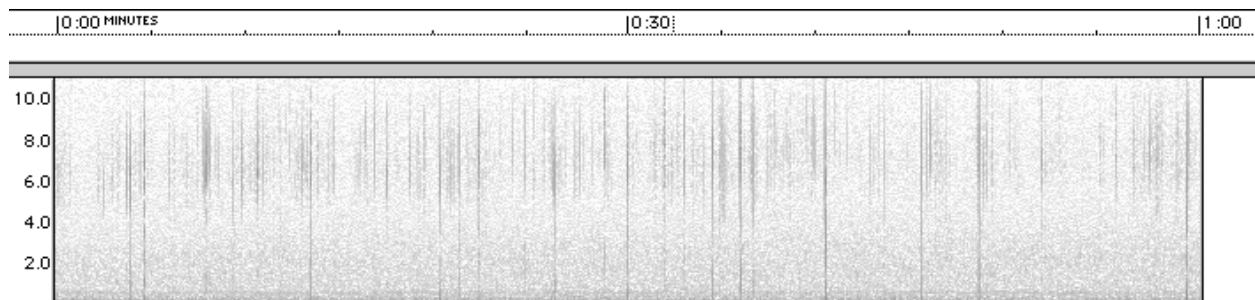
Starting off this report is an “uncoordinated observation” session from last May. This data was submitted before the last Journal, but the tapes were misplaced (perhaps in the vast INSPIRE archive storage area – my garage!). Mark is a long time contributor and this data consists of good quality signal with a very low 60 hertz hum level.



The two minutes starting at 1300 CDT. The vertical lines are strong sferics with medium density.



At 0-11 kHz, the sferics extend to the top of the display.



A density of about 2 strong sferics per second.

Bob started out the Coordinated Observations on Saturday, November 23, 2002. Robert is a field tester for the VLF-3, which is the receiver he used for these observations. Unfortunately, it was quiet across the country on the Coordinated Observation weekend. Robert included the following note.

Enclosed are my recordings and logs for the 23 November 2002 INSPIRE coordinated monitoring session. I was unable to monitor on the 24<sup>th</sup>.

I arrived at my remote "quiet" site at about 0500 MT (1200 UTC). For the next twenty minutes I set up my equipment, which consisted of an early version on the VLF-3 receiver, a stereo recorder and a WWV receiver. My antenna was a 6-foot long whip elevated about 3 feet above ground level. I started recording at 0530 MT in the hopes of detecting whistlers and possibly chorus that frequently occur around the time of local sunrise in the desert.

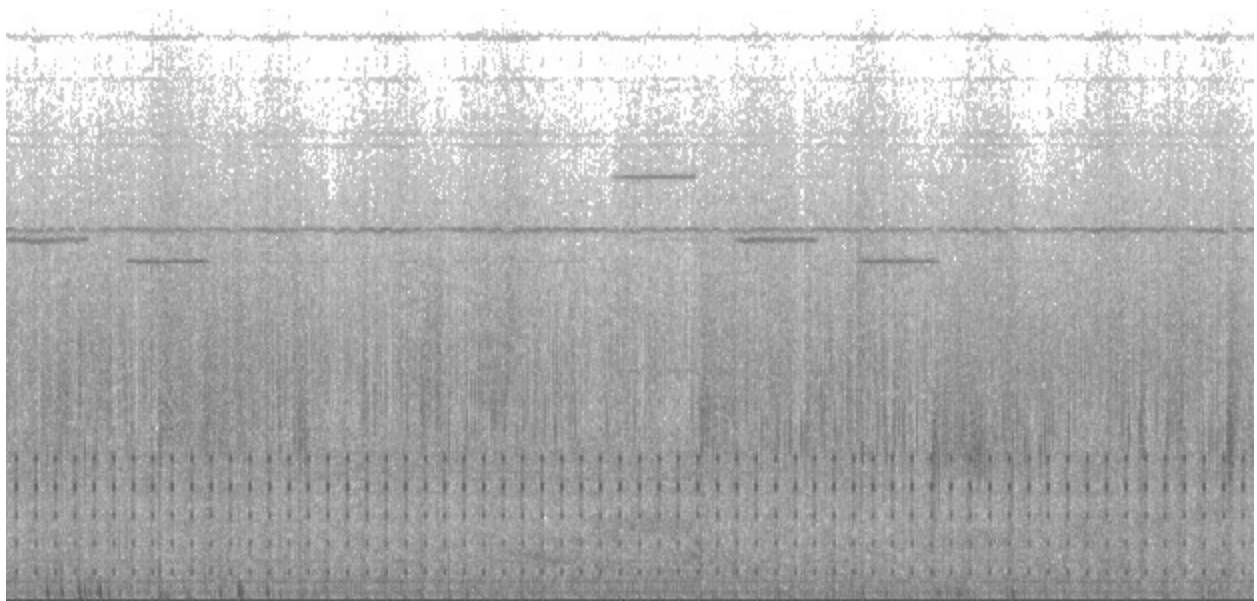
I found the monitoring conditions to be very poor which made detecting whistlers quite difficult. LORAN interference was severe and the levels of the natural radio signals were weaker than I normally observe. I was forced to employ the VLF-3's antenna attenuator and low pass filter to effectively eliminate the LORAN signal. This had the undesired side effect of attenuating the already weak natural radio signals and introducing additional random noise into the receiver front end. I have enclosed a disk with three files to show the conditions I faced. The first file shows a GRAM spectrum plot using a 10 MS resolution. Note that the individual LORAN pulses are resolved. The second file used 50 MS resolution and the LORAN pulse group of usually four pulses is visible. The third file shows the effect of the VLF-3's antenna attenuator.

I recorded continuously from 0530 to 0700 MT. Then I changed to the INSPIRE recommended technique of only recording the first 15 minutes after each hour. I continued recording until 0915, then secured my equipment and departed.

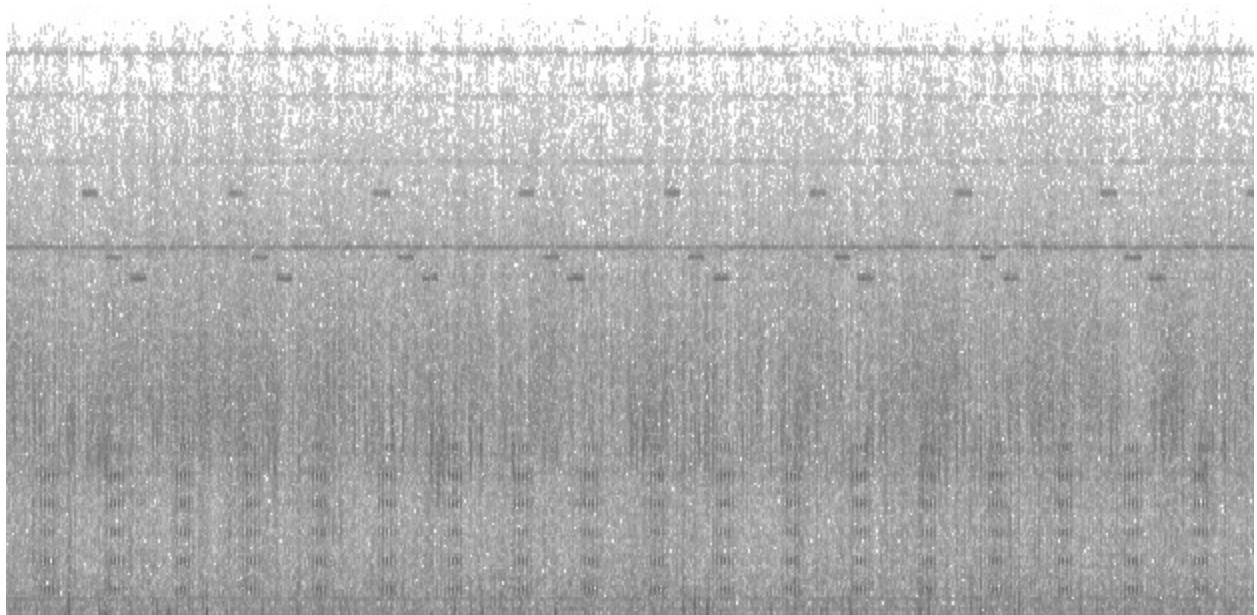
The outcome of the exercise was disappointing. I recorded three weak diffuse whistlers, two at about 0545 MT and another one at about 0714 MT.

Robert Bennett

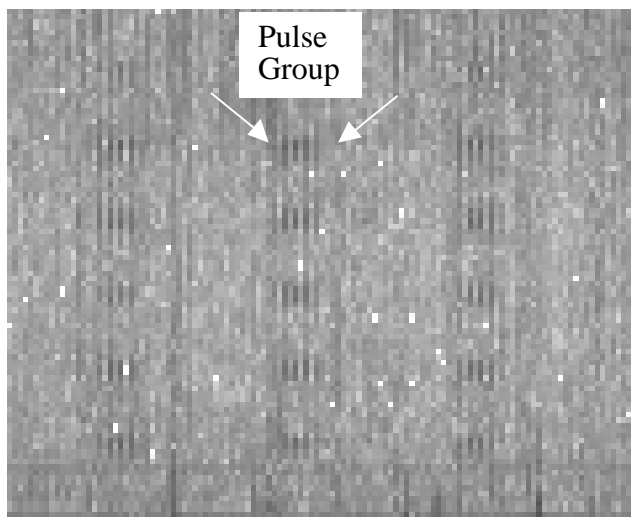
The spectrograms submitted by Bob were made using the GRAM software program, which is available free from the author Richard Horne. The first file is shown on the next page.



This view shows Russian Alpha navigation signals as a sequence of three horizontal dashes above 10 kHz. LORAN shows up as vertical patterns of dashes and sound like a clicking sound.



This view shows the difference with a change in resolution. The ALPHA dashes are shorter and more time is included. The group of 4 LORAN pulses is seen. It is the frequency of the groups that is the frequency of the “clicks” that are heard on the tape.

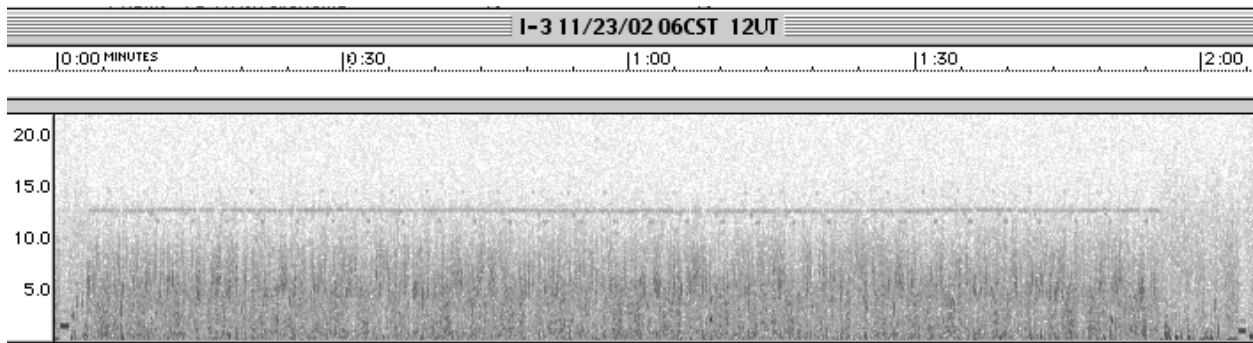


This close up shows the four-pulse group of the LORAN signal.

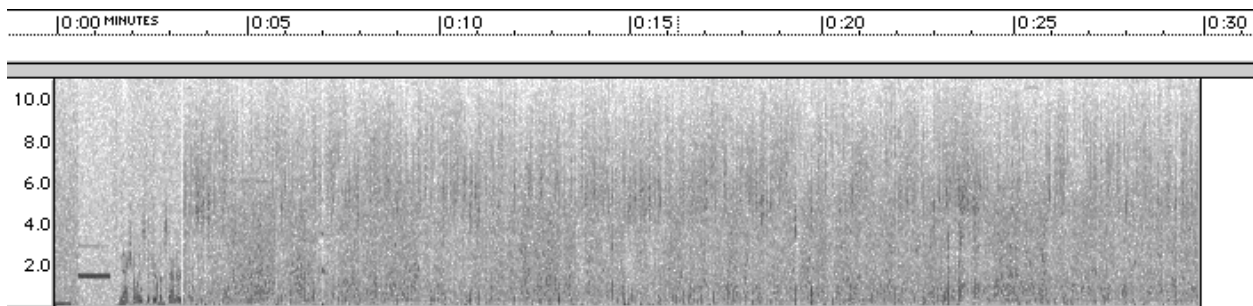


This the third file mentioned by Bob and this one shows the effect of switching the antenna attenuator in. Compare this with the first GRAM spectrogram.

## 11/23/2002 1300 UT

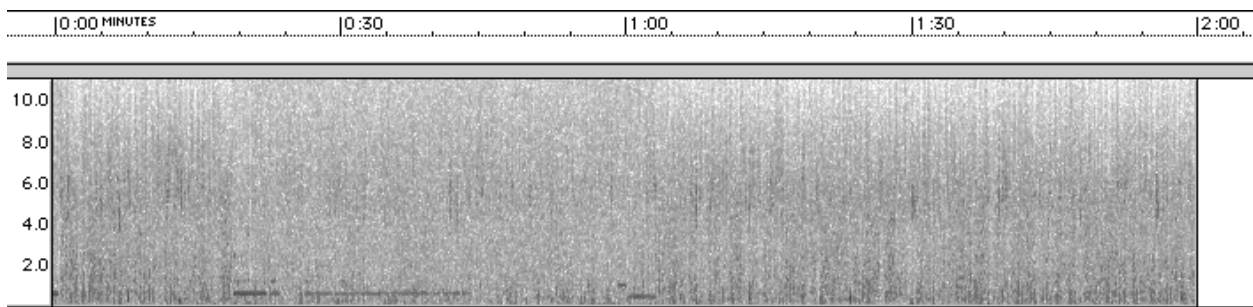


There is an error in the filename: it should read “12UT”. This shows dense sferics with some tweeks. As the morning went on, the tweeks became less common with just sferics being heard.



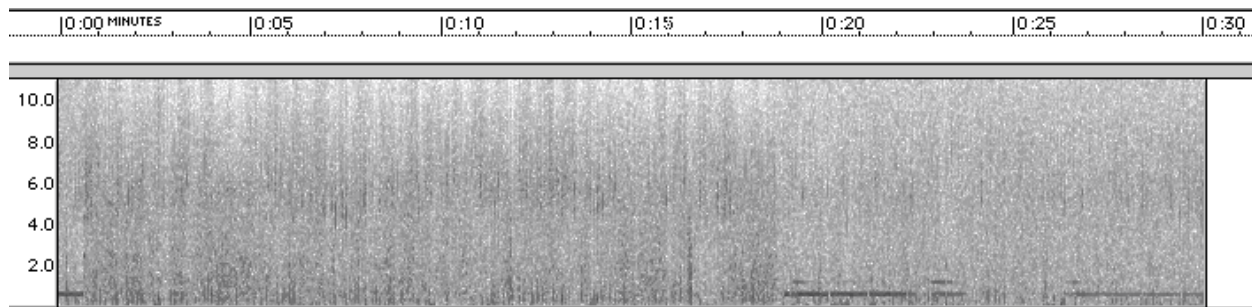
This view of the first 30 seconds starts with the WWV minute tone.

## 11/23/2002 1400 UT

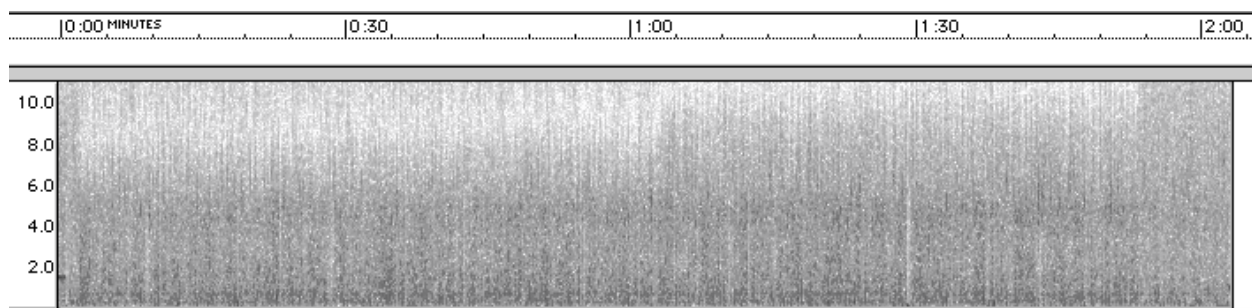


Dense sferics, no whistlers.

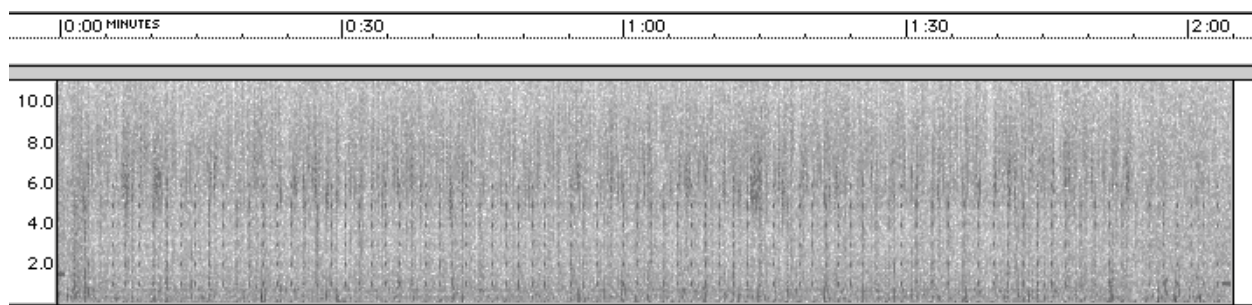




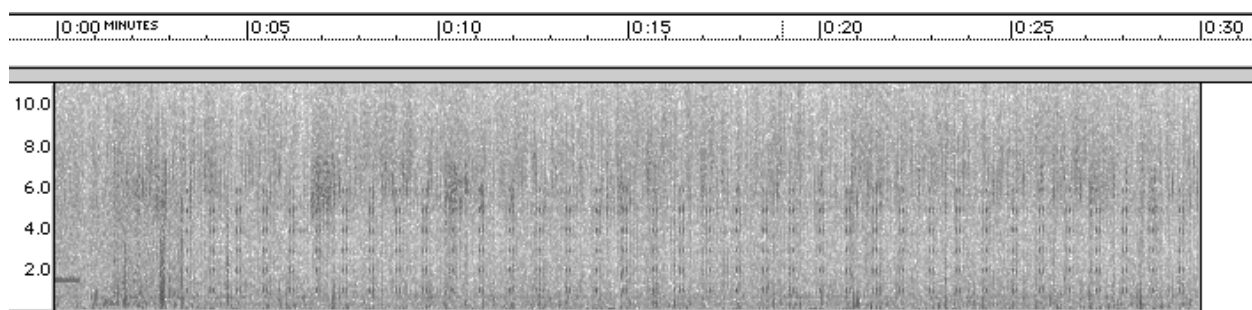
**11/23/2002 1500 UT**



**11/23/2002 1600 UT**



Three hours after the start of observations and not much change has occurred.



Mitchell wrote:

Please find enclosed my data for the November 23-24 coordinated observation activity. For the November 2002 coordinated listening session I was unable to go camping, so I just tried listening from home. I have heard whistlers this way, in spite of the hum. This weekend I heard nothing except spherics—no tweeks or ULF phenomenon.

As an experiment, I wound an 18-turn loop using a 250' roll of 14g Romex. This picked up signal~ and nulled a component of the hum, but it did not provide as good a signal-to-noise ratio as my wire antenna. In a remote location plagued with a little hum, this loop would give the extra measure of nulling necessary to completely eliminate all hum. Romex is cheap (less than \$20 for a 250' roll), so it doesn't cost much to give it a try. In case anyone is interested, the loop was 18 turns in a pancake spiral, about 4' inside diameter, with the three conductors wired in series for a total of 54 turns of wire. This yields about 8.5mH inductance, and should be loaded with 50 ohms and a 33nF capacitor. The loading can be provided by a transistor amplifier transformer, such as a Mouser 42TM114 (4.6 kohms:20 ohms), with the 20-ohm winding connected across the loop. The 4.6-kohm winding then couples directly into the tape recorder microphone input.

Listening notes:

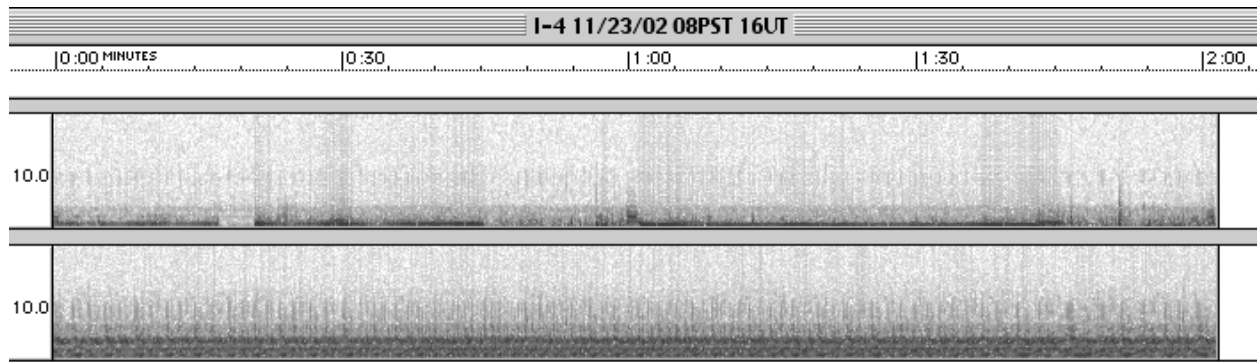
Equipment: homebrew receiver, Sanyo RD W40D tape deck, 155' inverted L antenna at 60', Sony ICF2001 for WWV.

Saturday: recorded 1600 and 1700UTC. No tweeks, but some spherics are audible under the hum. BCI from local stations splattering on WWV at 5, 10, and 15MHz, unaffected by attenuator. 1600 recording starts a little late.

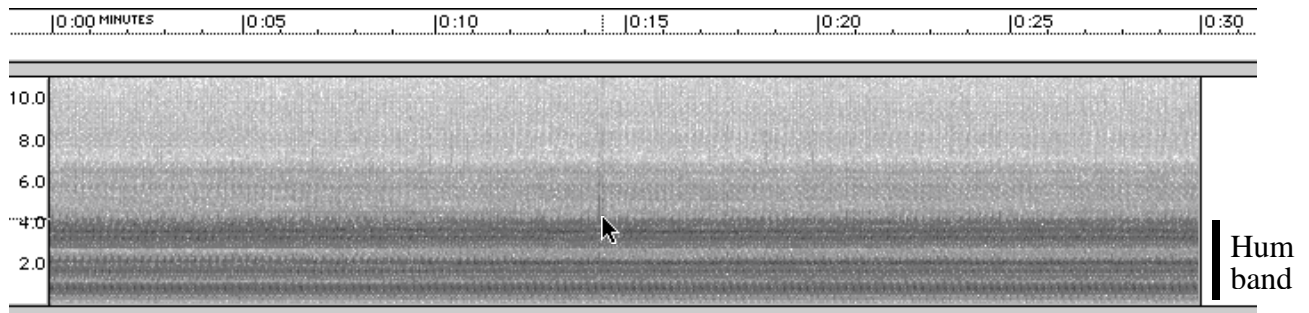
Sunday: recorded 1600 and 1700UTC. No tweeks, but some spherics are audible under the hum. BCI not present in WWV receiver. 1600 recording starts rolling at 1601.



**11/23/2002 1600 UT**

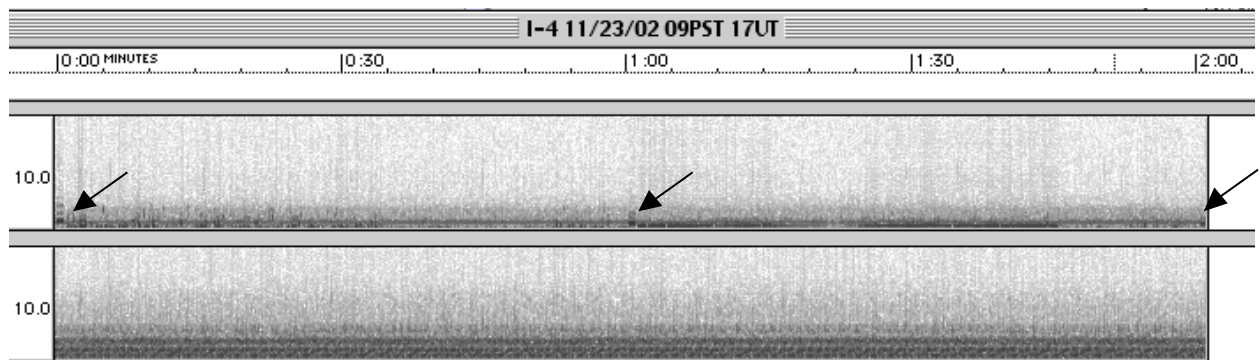


WWV on the top track: data signal on the bottom track.



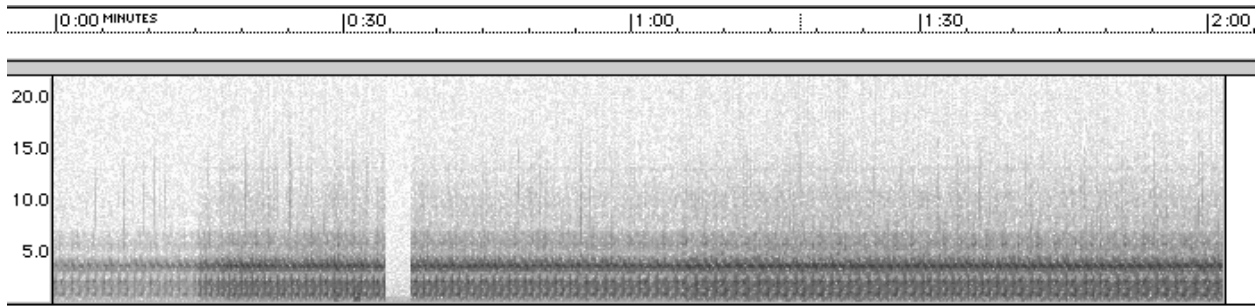
The arrow points to a sferic poking up above the hum band.

**11/23/2002 1700 UT**

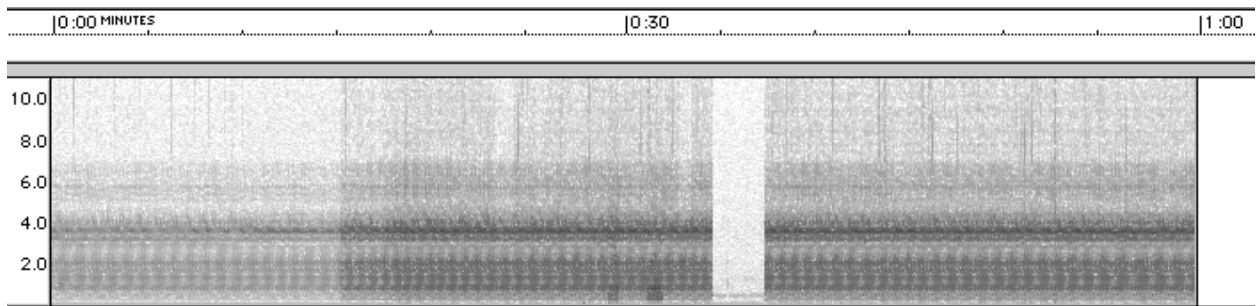


The arrows ppoint to WWV tones at 1700, 1701 and 1702 UT.

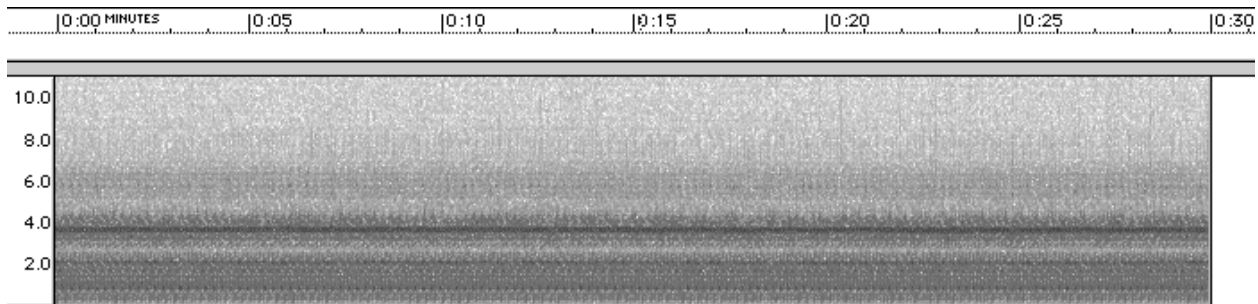
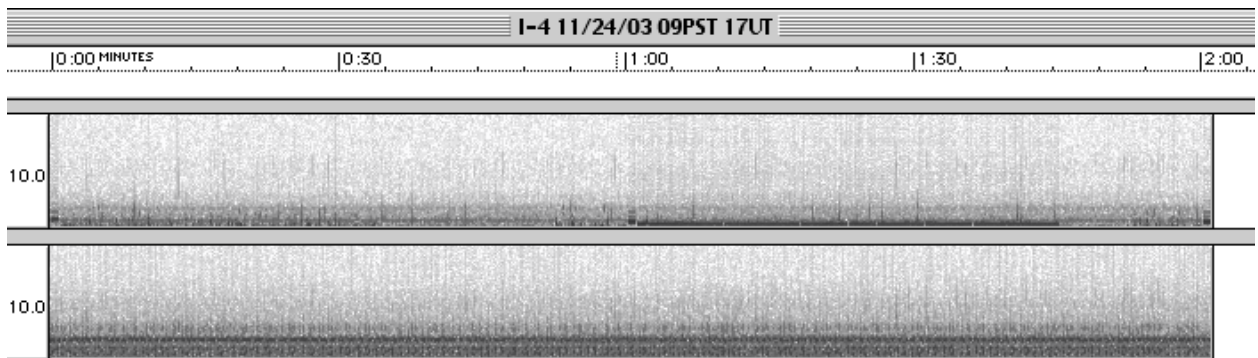
## 11/24/2002 1602 UT



Tape start time 1602 UT. Minor equipment trouble caused the gap in data.



## 11/23/2002 1700 UT

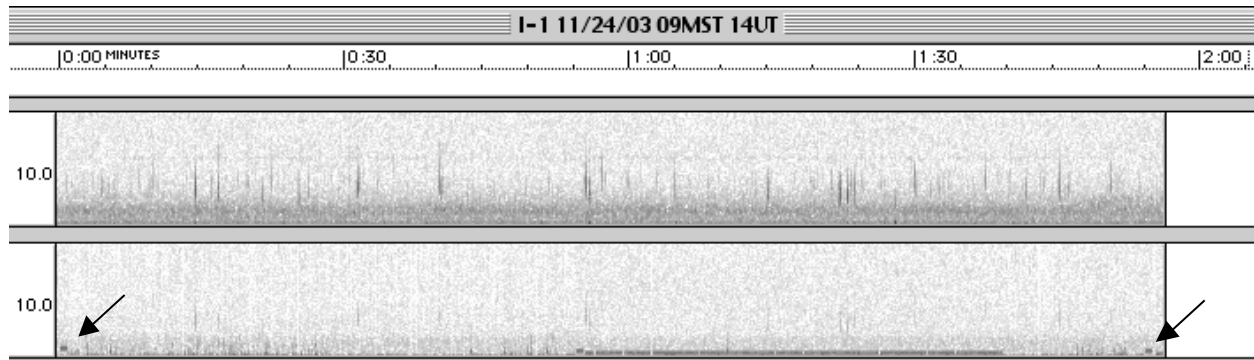


11/24/2002 Team I-1 Shawn Korgan

Gilcrest, CO

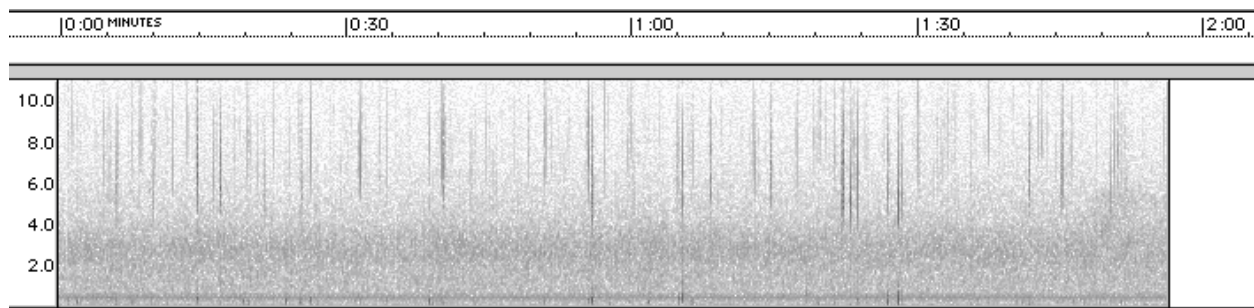
11/24/2002 1400 UT

Shawn made his observations using a VLF-3 from the open prairie with a light snow falling.

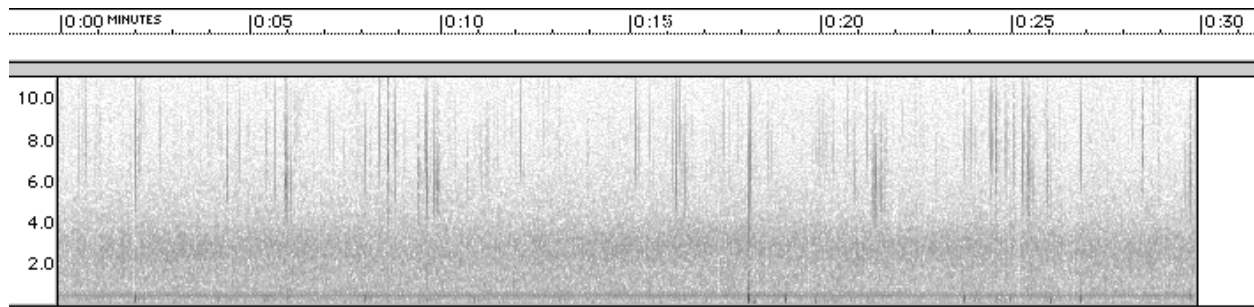


WWV on the bottom track; data on the top track. (Error in file name: 07MST)

The arrows point to the time marks at 1400 and 1402 UT. Notice that the second mark does not match up with the 2-minute mark on the spectrogram. This indicates a mismatch in recorder speeds.

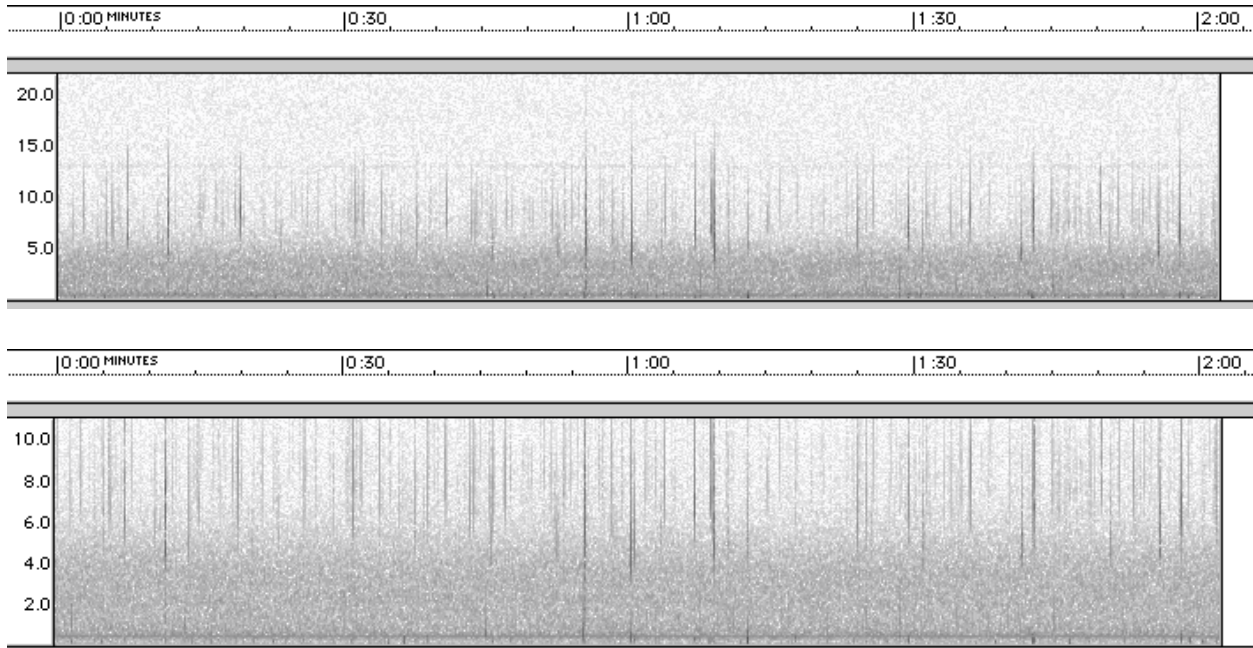


Note the strong sferics extending up above 10 kHz.

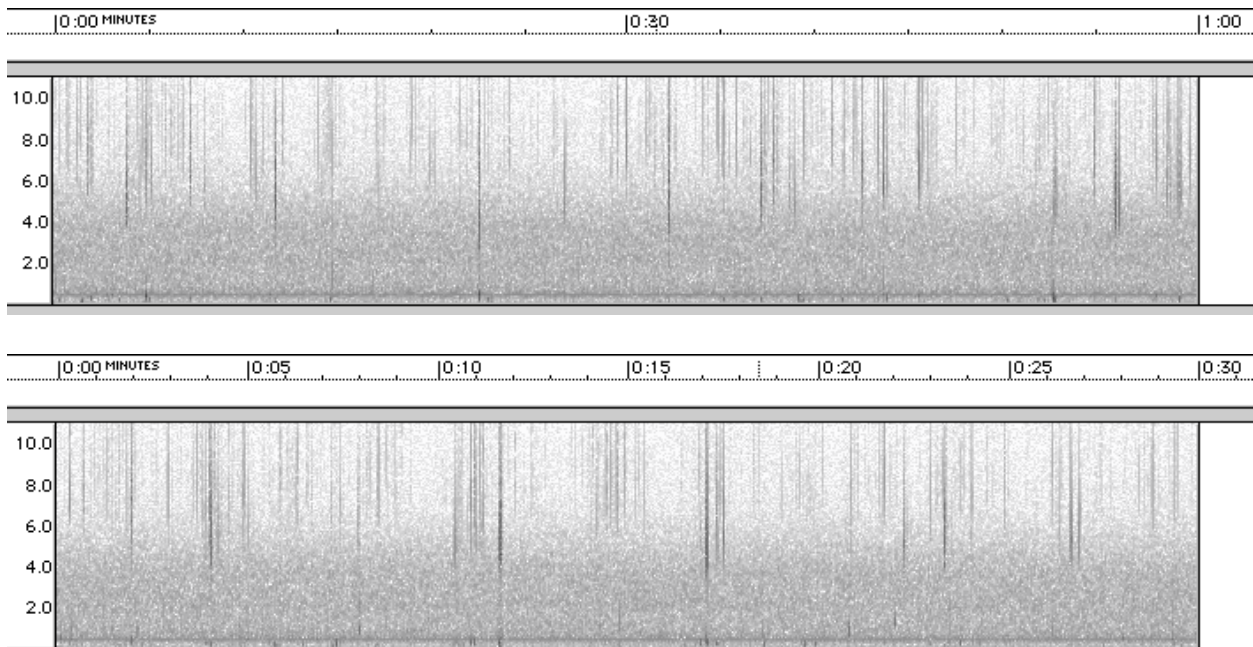




11/24/2002 1500 UT



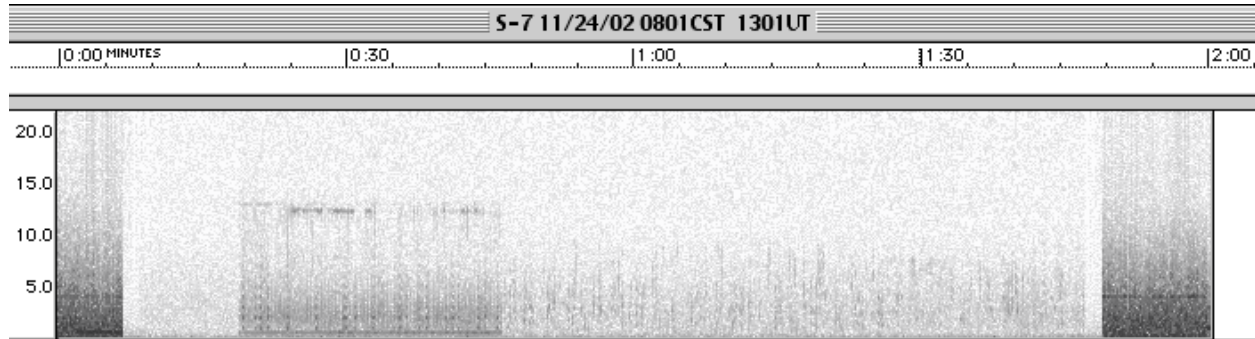
The above two spectrograms are for the same time interval. The first is using a 0-22 kHz frequency range while the second uses a 0-11 kHz frequency range.



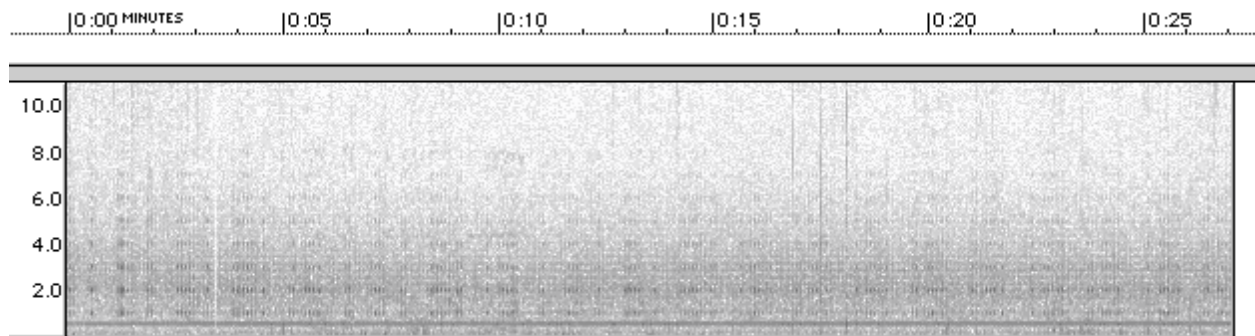
11/24/2002 Team S-7 Bill Combs, Crawfordsville High School

Crawfordsville, IN

11/24/2002 1301 UT

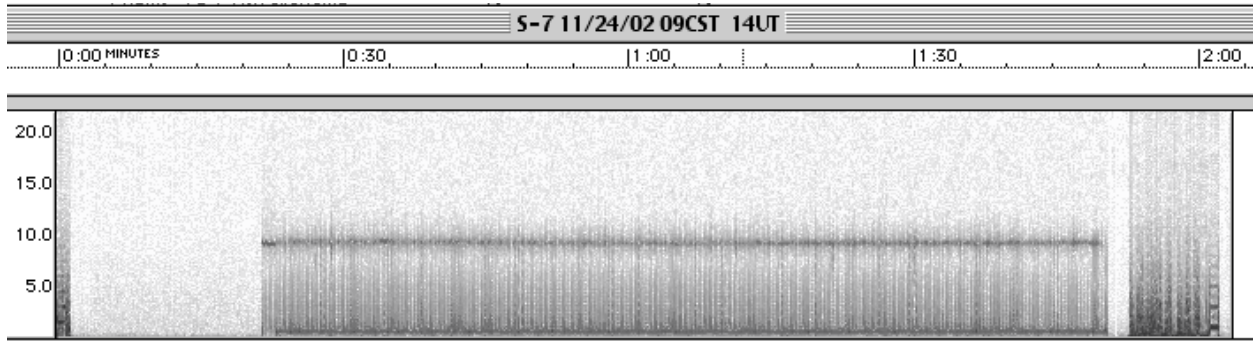


This tape starts with about 10 seconds of WWV, 15 seconds of silence while switching inputs, 30 seconds of good data (sferics and LORAN) and then a TV signal showed up masking all future data. The site is very quiet with almost no hum band.

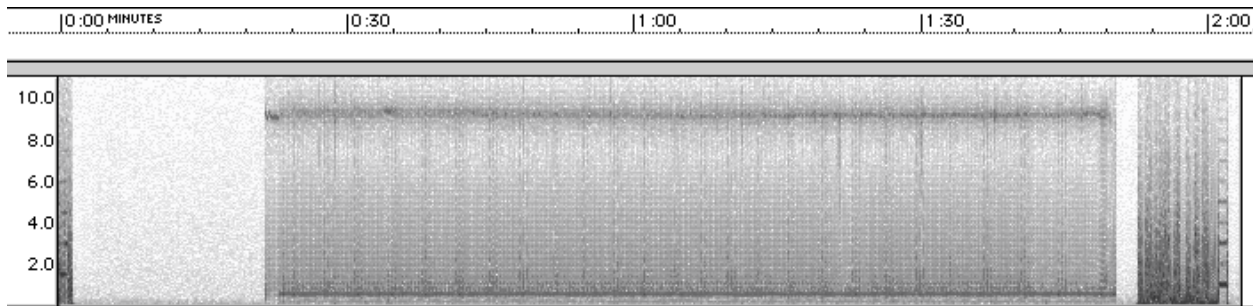


This is the “good” data segment. Strong sferics, little hum.

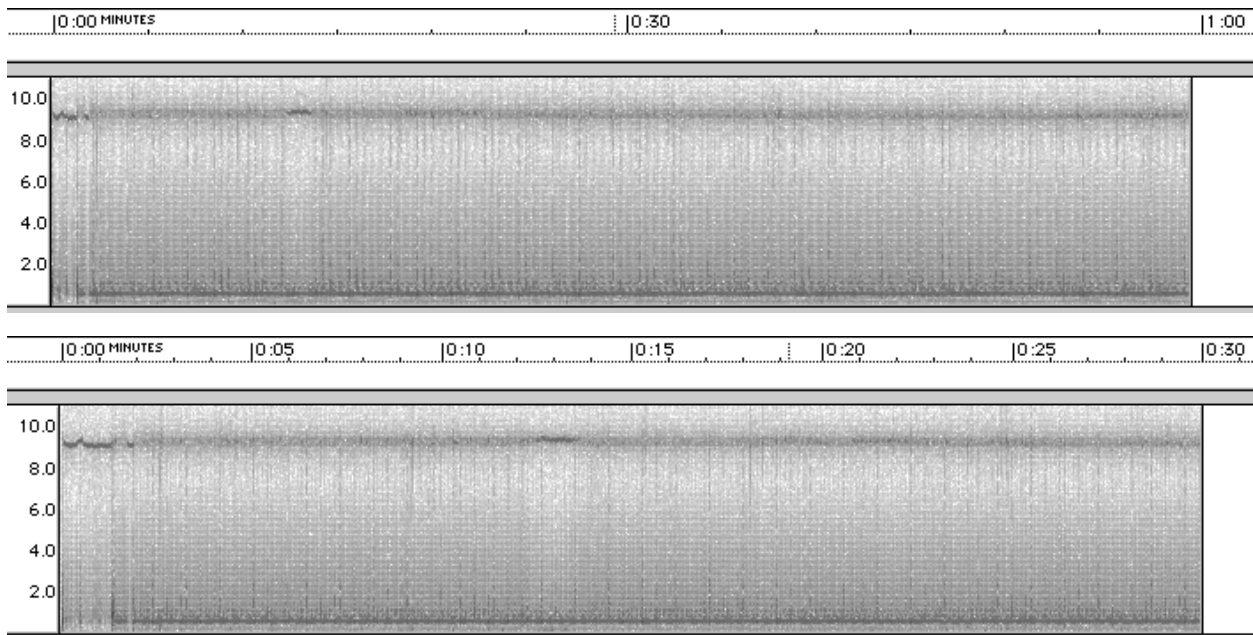
11/24/2002 1400 UT



An hour later, the TV signal is gone, but a very noisy manmade source is present just below 10 kHz. This apparently was turned on between 1300 and 1400 UT.



WWV tones begin and end this spectrogram. The receiver is working well, picking up sferics audible with the strong manmade signal.



LORAN and the strong signal below 10 kHz dominate this spectrogram. Sferics are audible and visible.



A large fire in the National Forest near our home burned an area including my observing site. The Forest was closed until further notice and remains closed now – probably until snow season is over. At an elevation of 4400 feet, not much snow falls there, but they close the road from first snow until last snow so they don't have to patrol that area. The remoteness from development is the best feature of this site and it is only a half hour from school.

Since that site could not be used, I had to come up with a Plan B. The desert east of here used to be a good place to observe, but it has become so developed that there doesn't seem to be anywhere that does not have power lines. One place I have been to before has escaped development so far, but it is over 200 miles from home and the last several miles of that is desert washboard road. This is not an ideal site to take students to since it would involve camping and all that entails with students (equipping them, special permission, food, etc.). Since that did not seem feasible, I invited my wife to go camping with me, so off we went to Mid Hills Campground near Kelso, CA.

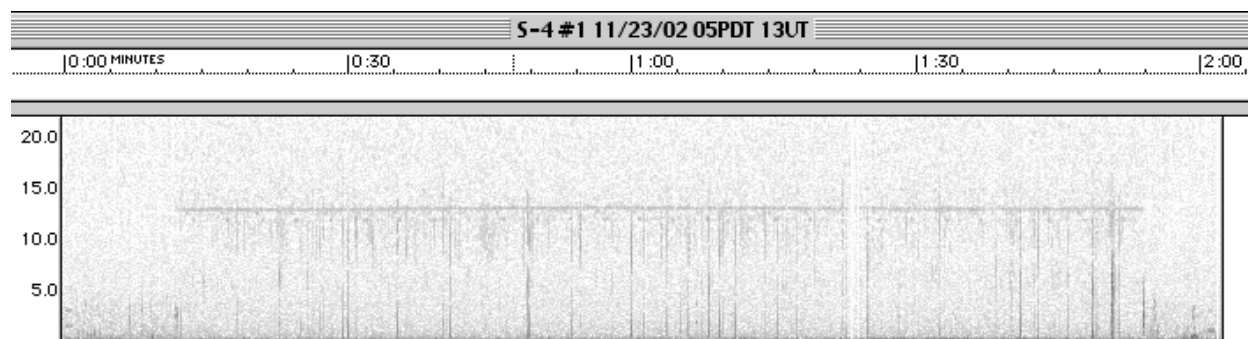
The site is beautiful. At about 4000', the campground is in a pinon pine forest with beautiful rock formations all around. Water is provided and the pit toilets have concrete floors and so are a step above the worst. Beth was happy.

I set up 3 receivers:

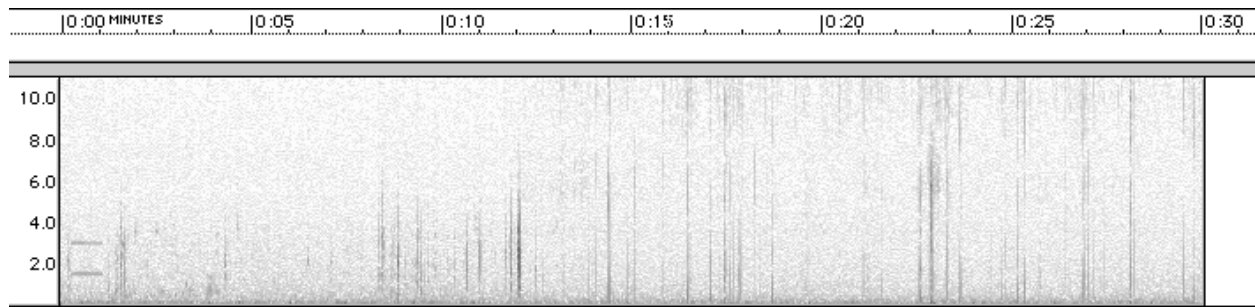
- Receiver #1 ACTIVE B-field receiver with a loop antenna
- Receiver #2 INSPIRE RS-4 receiver with 6' whip antenna
- Receiver #3 INSPIRE VLF-3 receiver with 6' whip antenna

I got up at 4:30 AM so I could start taping at 5 AM (1300 UT) to match the recordings at 8 AM EST on the East Coast. I then recorded at each hour through 9 AM PST. I did this on both days of the Coordinated Observations.

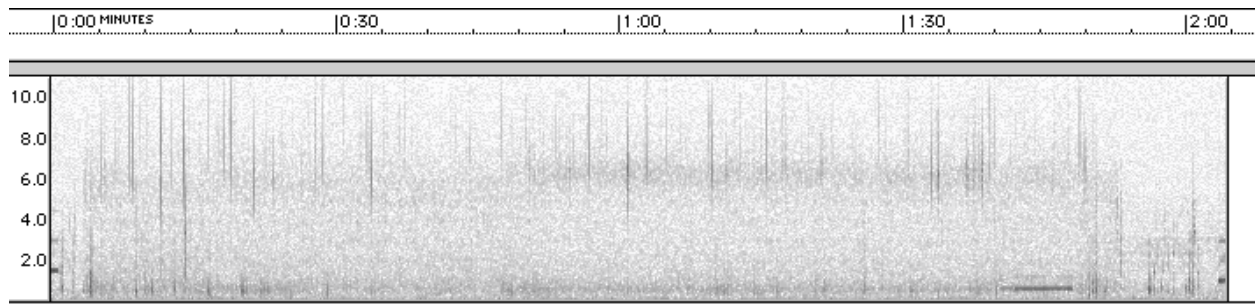
### 11/23/2002 1300 UT



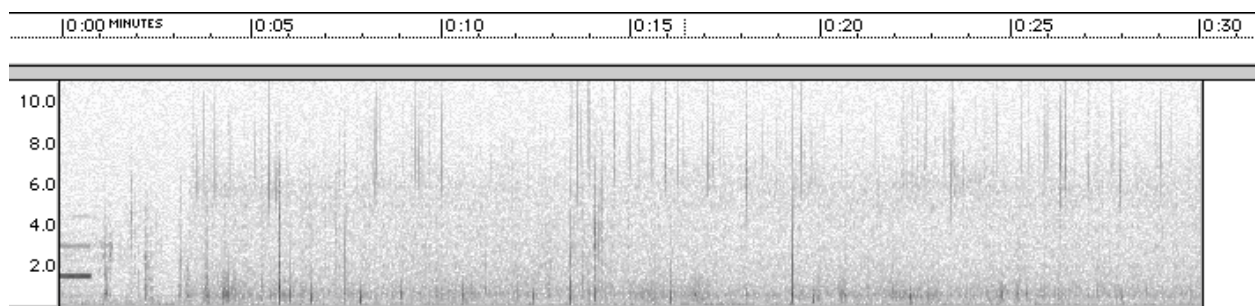
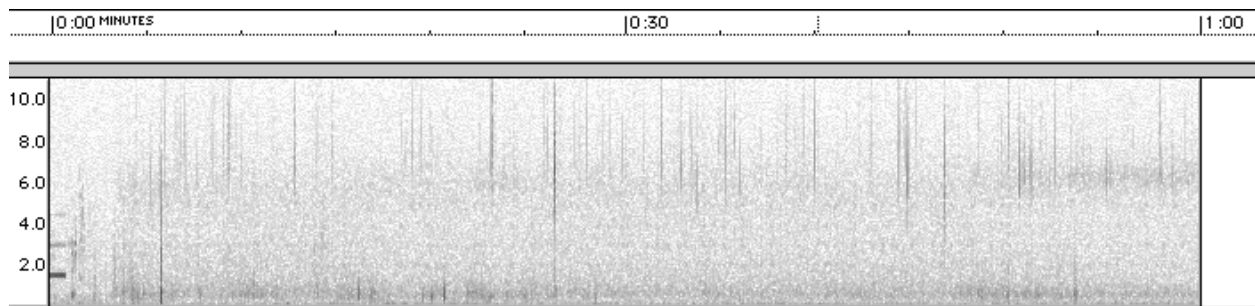
Receiver #1.



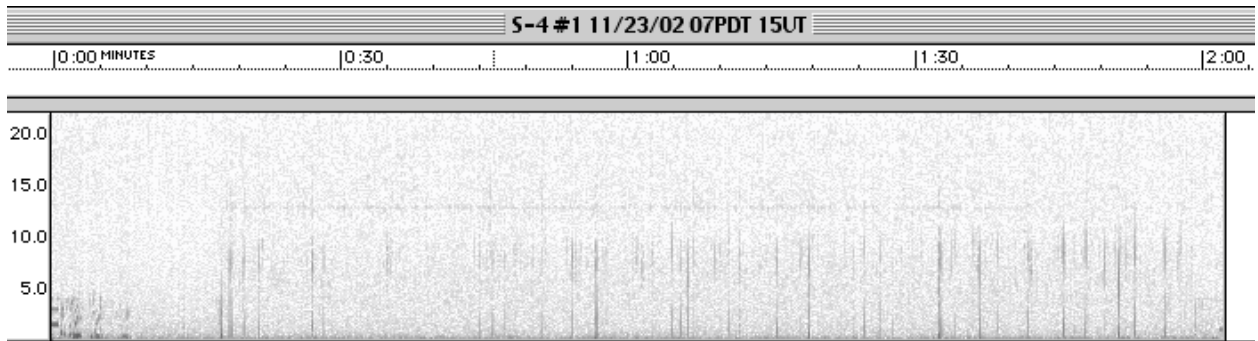
**11/23/2002 1400 UT**



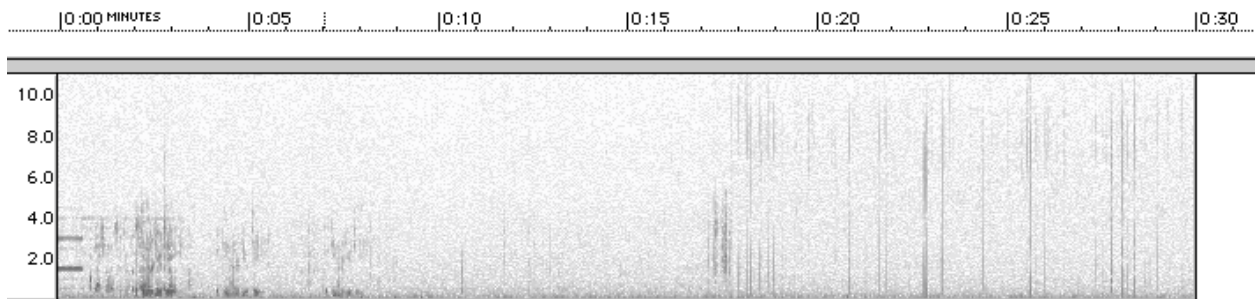
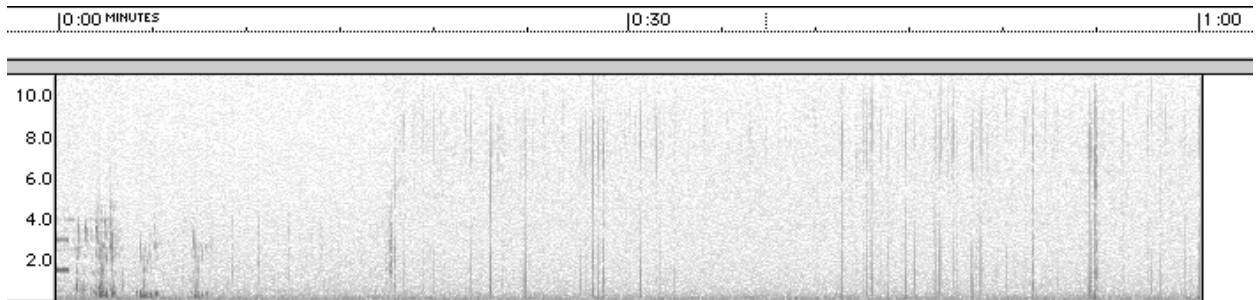
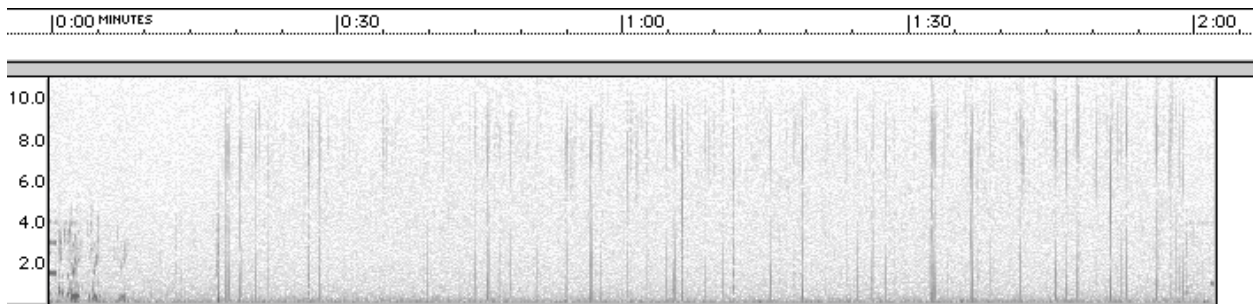
**Receiver #3**



11/23/2002 1500 UT



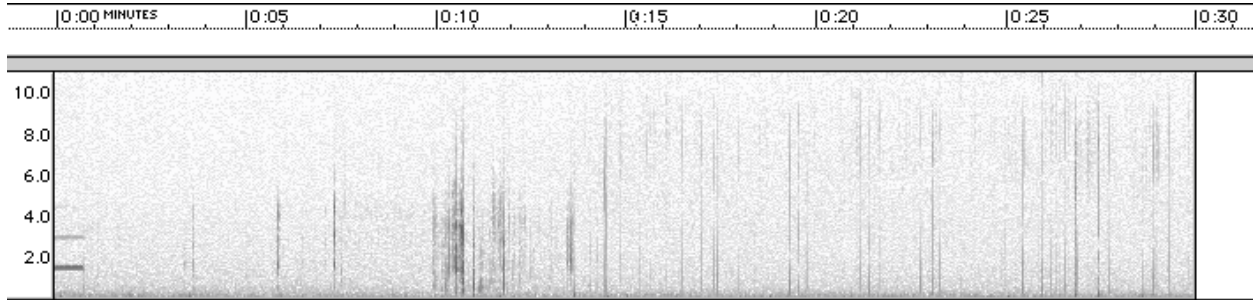
Receiver #1



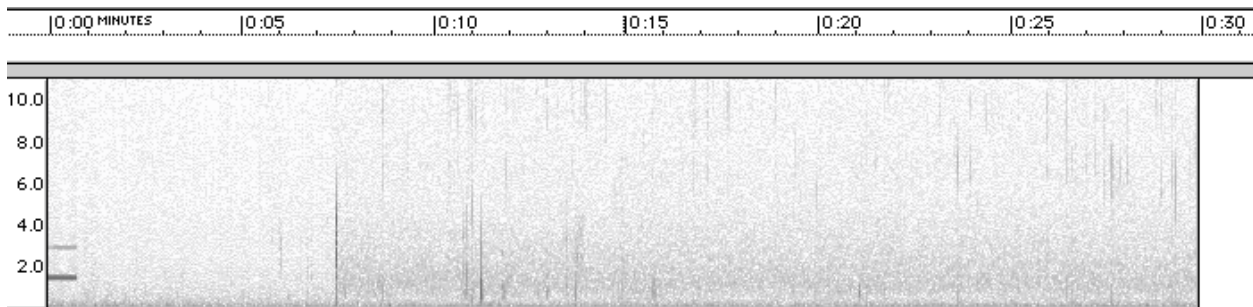


**11/23/2002 1600 UT**

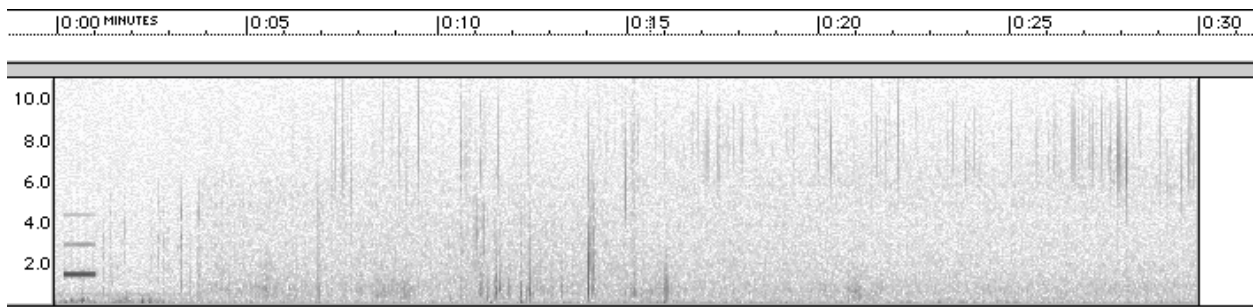
I had problems with Receiver #2 (RS-4), but finally got it working. The following spectrograms compare the receivers.



Receiver #1 ACTIVE



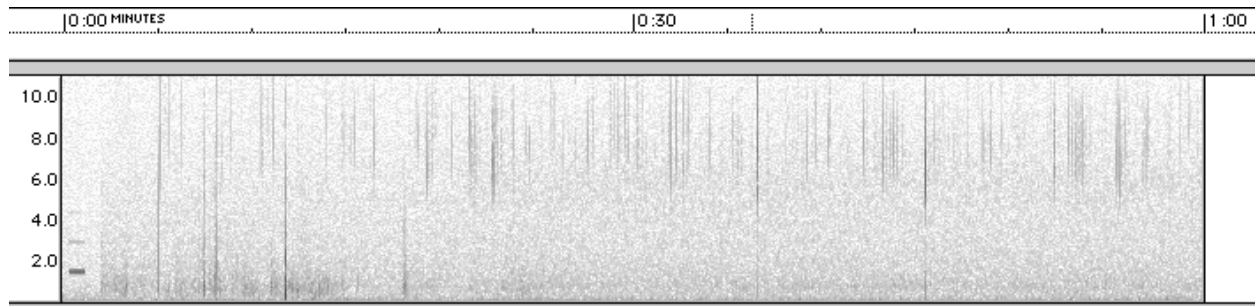
Receiver #2 RS-4



Receiver #3 VLF-3

While conditions were unusually quiet during the entire weekend, the VLF-3 outperformed the other receivers by a significant margin.

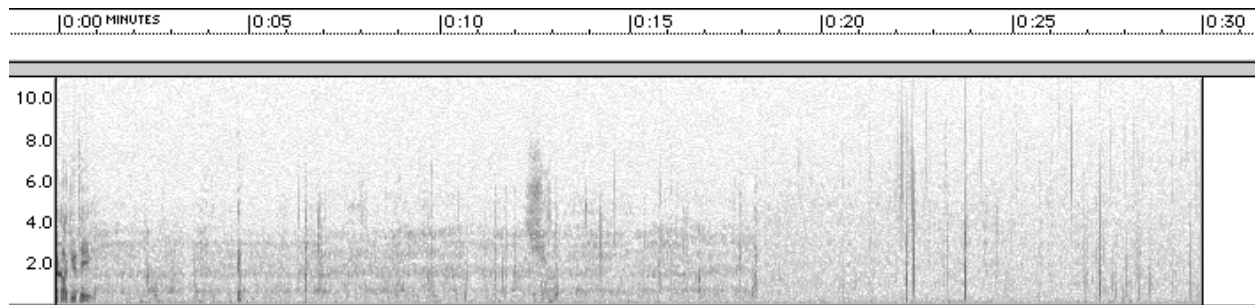
**11/23/2002 1700 UT**



Receiver #3

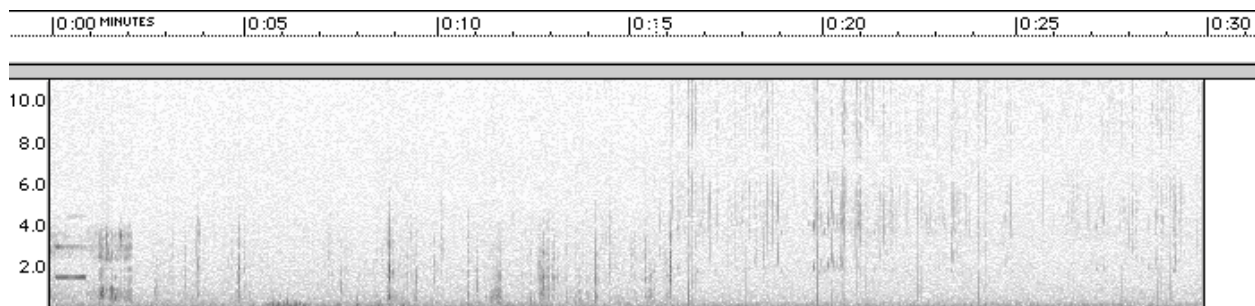
**11/23/2002 1700 PST 0100 UT (11/24)**

I made some observations at 5 PM local time in hopes of hearing something interesting.



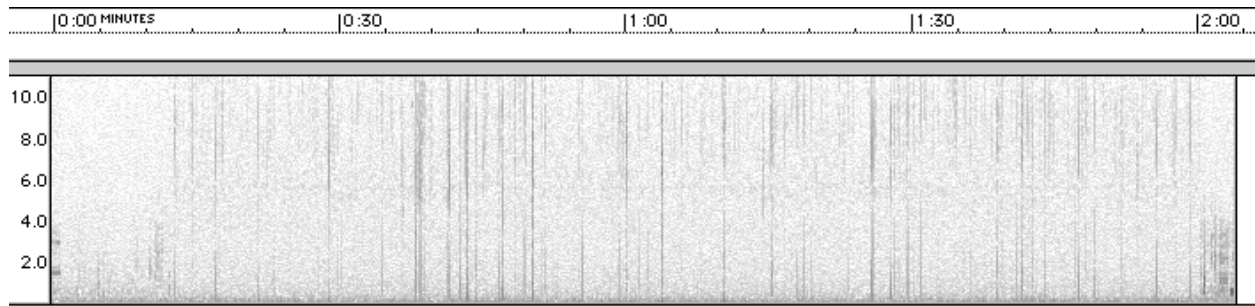
I had never listened at sunset before without hearing tweeks at least. Now I have.  
Nothing but sferics.

**11/23/2002 1800 PST 0200 UT (11/24)**



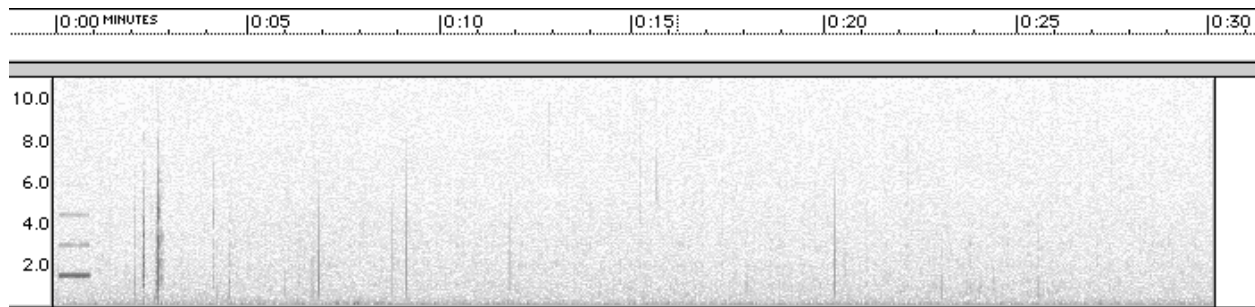
Receiver #1. An hour later and no change.

**11/24/2002 1300 UT**



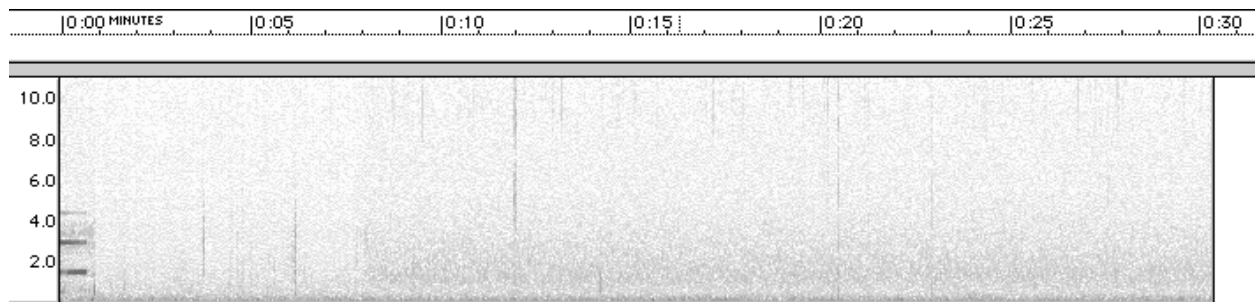
Receiver #1. Strong sferics, but nothing else.

**11/24/2002 1400 UT**



Receiver #3.

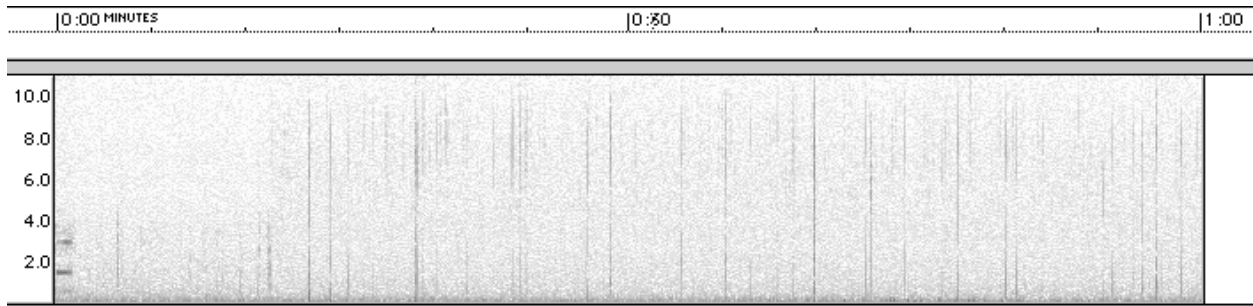
**11/24/2002 1500 UT**



Receiver #2.

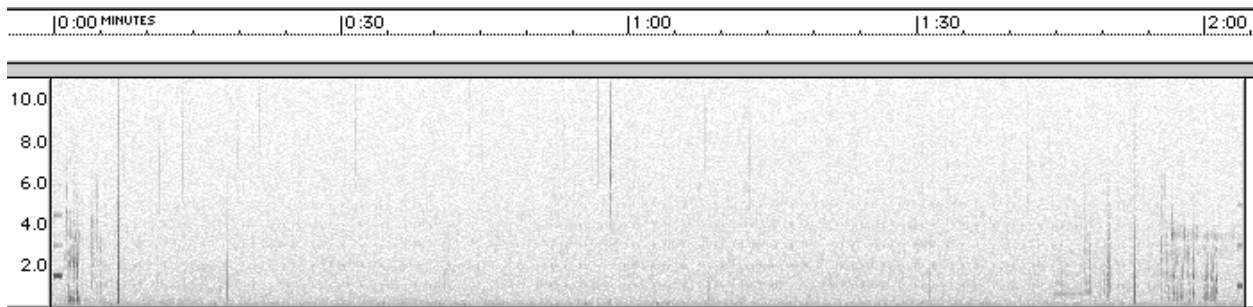


**11/24/2002 1600 UT**



Receiver #1.

**11/24/2002 1700 UT**



Receiver #3.

